

REMARKS

Claims 1 through 6 are currently pending in the application.

Claims 1 through 6 stand rejected. Applicant has amended claims 1, 3, and 5, and respectfully requests reconsideration of the application as amended herein.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent 6,166,434 to Desai et al. in view of U.S. Patent 6,451,155 B1 to Toy et al.

Claims 1 through 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Desai et al. (U.S. Patent 6,166,434) in view of Toy et al. (U.S. Patent 6,451,155 B1). Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

After carefully considering the cited prior art, the rejection, and the Examiner's comments, Applicant has amended the claimed inventions to clearly distinguish over the cited prior art.

Turning to the cited prior art, the Desai et al. reference teaches or suggests a die clip for use in semiconductor flip chip packaging as a replacement for the combination of a heat spreader and stiffener, a packaging method using the die clip, and a semiconductor package incorporating the die clip. The die clip engages the die while leaving some space open around the perimeter to provide access to the die. An underfill material is dispensed into the gap between the die and the substrate through an opening in the die clip. The underfill material is then cured, the die clip

providing a heat sink. A BGA process may then be used to apply solder balls to the underside of the substrate for bonding of the package to a circuit board for use.

The Toy et al. reference teaches or suggests silicon-containing polymeric adhesives (a silicon elastomeric material) used to attach a heat sink to a multi-chip module.

Applicant asserts that any combination of the Tay et al. reference and the Toy et al. reference does not and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed inventions of presently amended independent claims 1, 3, and 5 because any combination of the Tay et al. reference and the Toy et al. reference, at the least, fails to teach or suggest all the claim limitations of the presently amended independent claims 1, 3, and 5. Applicant asserts that any combination of the Tay et al. reference and the Toy et al. reference fails to teach or suggest the claim limitations of presently amended independent claims 1, 3, and 5 calling for “placing a compliant adhesive-filled gel silicone elastomer between a portion of an upper surface of the semiconductor die and a portion of a lower surface of the heat sink cap, the heat sink cap surrounding the semiconductor die; pressing the semiconductor die into the heat sink cap to engage the semiconductor die and heat sink cap in compliant removable adhesion and for causing the edge of the heat sink cap to abut the substrate; and injecting an encapsulant into the heat sink cap through at least one hole therein engaging at least interior portions of the heat sink cap, at least portions of the semiconductor die, at least portions of the top surface of the substrate, and at least portions of the compliant adhesive-filled gel silicone elastomer.”, “positioning a compliant adhesive-filled gel silicone elastomer between the semiconductor die and the cap, the cap surrounding the semiconductor die; pressing the semiconductor die into the cap causing removable adhesion of the semiconductor die and the cap and causing the lower edge of the cap to abut the substrate; and injecting an encapsulant into the cap through at least one hole therein engaging at least interior portions of the cap, at least portions of the semiconductor die, at least portions of the top surface of the substrate, and at least portions of the compliant adhesive-filled gel silicone elastomer. ‘, and “providing a compliant adhesive-filled gel silicone elastomer between a portion of an upper surface of the semiconductor die and a portion of a lower surface of the heat sink cap for engaging the semiconductor die and heat sink cap in compliant removable adhesion for abutting the edge of the heat sink cap to the substrate, the heat

sink cap surrounding the semiconductor die; and placing an encapsulant into the heat sink cap through at least one hole therein for engaging interior portions of the heat sink cap, portions of the semiconductor die, portions of the top surface of the substrate, and portions of the compliant adhesive-filled gel silicone elastomer.” Applicant asserts that, in contrast to the claimed inventions of presently amended independent claims 1, 3, and 5, any combination of the Tay et al. reference and the Toy et al. reference merely teaches or suggests a cap which does not surround the semiconductor die, has underfill injected into a space between the semiconductor die and substrate through one of the open sides of the cap, and uses an adhesive to attach the semiconductor die to the cap. Applicant asserts that such is clearly not the claimed inventions of presently amended independent claims 1, 3, and 5. Accordingly, presently amended independent claims 1, 3, and 5 are allowable as well as dependent claims 2, 4, and 6 therefrom respectively.

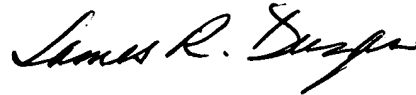
ENTRY OF AMENDMENTS

The amendments to claims 1, 3, and 5 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application to clearly comply with the provisions of 35 U.S.C. § 132.

CONCLUSION

Claims 1 through 6 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



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